

3.7 NOISE

This section briefly characterizes noise concepts and noise in the Dutch Slough area. Potential noise impacts of constructing and operating the proposed park and wetland restoration projects are described, and applicable mitigation measures are identified. It should be noted that noise impacts of park facilities beyond those shown in Figure 2-18, City Community Park Initial Improvements, and noise from special events at the proposed City Community Park are not addressed in this section, and would require subsequent CEQA review at the time that they are proposed. This section focuses on noise impacts to sensitive human receptors. Noise impacts to wildlife are described in Section 3.4, Terrestrial and Wetland Resources.

3.7.1 Affected Environment

Noise Characteristics

Noise is generally defined as unwanted or annoying sound that is typically associated with human activity and which interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. Hearing loss requires that noise levels exceed thresholds generally not found in ambient environments. Hearing loss danger is generally associated with occupational exposures. Hearing damage is proportional to the product of noise magnitude time-exposure duration (dose), which accumulates over time. The combination of high noise levels and chronic, persistent exposure pose the greatest risk. The response to environmental noise is mainly psychological. Some physiological effects from loss of sleep, irritation or similar annoyance can be observed in people exposed to elevated environmental noise. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day, the type of activity during which the noise occurs, and the sensitivity of the individual hearing the sound.

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually expressed as the logarithmic ratio of the square of the ambient sound pressure level compared to the pressure from the faintest sound detectable by a young person with good auditory acuity. The units of this ratio are called decibels (dB). Most of the sound humans hear in the environment do not consist of a single frequency, but rather a broad band of frequencies differing in sound level. The intensities of each frequency add to generate the sound we hear. The method commonly used to quantify environmental sounds consists of determining all of the frequencies of a sound according to a weighting system that reflects that human hearing is less sensitive at low and extremely high frequencies than at the mid-range frequencies. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (or dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve. Any further reference to decibels expressed at "dB" should be understood to be A-weighted unless otherwise noted.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a combination of noise from distant sources that create a relatively steady background noise in which no particular source is identifiable. A single descriptor called the LEQ (equivalent sound level) is most commonly used for environmental noise. LEQ is the energy-mean A-weighted sound level during a measured time interval. It is the 'equivalent' constant sound level that would have to be produced by a steady state source to equal the fluctuating level measured.

Another sound descriptor has been developed in an attempt to characterize the "total" sound environment. This descriptor penalizes noise levels during periods of greater noise sensitivity to create an artificially weighted 24-hour exposure. This noise metric is known as the Community Noise Equivalent Level (or CNEL). It is calculated by adding a 5-decibel penalty to sound levels in the evening (7:00 p.m. to 10:00 p.m.), and a 10 decibel penalty to sound levels in the night (10:00 p.m. to 7:00 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours.

California state law requires that development planning use CNEL as the appropriate noise/land use compatibility criterion. CNEL's are used mainly to make land use decisions regarding noise exposure for those noise sources pre-empted from local control such as motor vehicles, airplanes, and trains. In contrast to noise performance standards governing sources amenable to local control, CNEL levels are therefore more reactive to the noise environment rather than being proactive noise control standards.

Applicable Standards/Requirements

STATE NOISE STANDARDS

The State of California has established guidelines for acceptable community noise levels that are based upon the CNEL rating scale to insure that noise exposure is considered in any development, as shown in Table 3.7-1. CNEL-based standards apply to noise sources whose noise generation is preempted from local control (such as from on-road vehicles, trains, airplanes, etc.) and are used to make land use decisions as to the suitability of a given site for its intended use. These CNEL-based standards are provided in the Oakley Noise Element of the General Plan. Since local jurisdictions cannot regulate the noise generator, they exercise land use planning authority on the receiving property.

OAKLEY GENERAL PLAN NOISE STANDARDS

NOISE ELEMENT STANDARDS

The City of Oakley's General Plan Noise Element identifies the following maximum allowable noise exposure to transportation sources:

Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use as determined for typical worst-case hour during periods of use.

Table 3.7-1: California Land Use Compatibility Guidelines for Exterior Community Noise

LAND USE	Community Noise Exposure CNEL, dB			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Single Family, Duplex, Mobile Homes	50-60	55-70	70-75	Above 75
Multi-Family Homes	50-65	60-70	70-75	Above 75
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-70	60-70	70-80	Above 80
Transient Lodging: Motels, Hotels	50-65	60-70	70-80	Above 80
Auditoriums, Concert Halls, Amphitheaters	-	50-70	-	Above 65
Sports Arena, Outdoor Spectator Sports	-	50-75	-	Above 70
Playgrounds, Neighborhood Parks	50-70	-	67-75	Above 72.5
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-75	-	70-80	Above 80
Office Buildings, Business and Professional Commercial	50-70	67-77	Above 75	Above 75
Industrial, Manufacturing, Utilities, Agriculture	50-75	70-80	Above 75	Above 75

Source: State of California Governor's Office of Planning and Research, General Plan Guidelines, 1990.

Normally Acceptable: Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable: New construction or development should generally not be undertaken.

The City of Oakley Noise Element specifies an exterior noise exposure level of 65 dB CNEL for all noise sensitive uses, with an interior level of 45 dB CNEL. If the 45 dB CNEL interior noise level can only be achieved with the closed window configuration, then mechanical ventilation (i.e., air conditioning) must be provided. These standards are the levels that must be achieved within the Dutch Slough Restoration Project as a basis for an acceptable residential noise exposure. The City's Noise Element standards are shown in Table 3.7-2

Table 3.7-2: City of Oakley Noise Element Maximum Allowable Noise Exposures

Land Use	Outdoor Activity Areas (dB CNEL)	Interior Spaces (dB CNEL)	Interior Spaces (Leq, dB)
Residential	65	45	--
Transient Lodging	65	45	--
Hospitals, Nursing Homes	65	45	-
Theaters, Auditoriums, Music Halls	--	--	35
Office Buildings	--	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Parks	70	--	--

NOISE ELEMENT POLICIES

The following City of Oakley Noise Element Policies would be relevant to the proposed Project:

- Policy 9.1.1 - New development shall comply with the land use compatibility standards identified in Table 1 above.
- Policy 9.1.2 - New development of noise-sensitive uses shall not be allowed where the noise level due to non-transportation sources exceed noise ordinance standards.
- Policy 9.1.3 - Noise created by new non-transportation sources shall be mitigated to not exceed noise ordinance standards.

OAKLEY NOISE ORDINANCE STANDARDS

Uses that are amenable to local control are generally considered "stationary sources." Local jurisdictions generally regulate the level of noise that one use may impose upon another. Table 3.7-3 shows the City of Oakley's adopted noise performance standards for new projects affected by or including non-transportation noise sources.

BASELINE NOISE LEVELS

Noise measurements were made in order to document existing baseline levels in the area. These help to serve as a basis for projecting future noise exposure, both from projects upon the surrounding community and from ambient noise activity upon the proposed project. Noise measurements were made at four locations surrounding the Dutch Slough Restoration Project and City Community Project sites. The results of the measurements and location description are detailed in Table 3.7.14. Wind noise created somewhat artificially elevated noise levels at all locations. Locations away from Cypress Road recorded similar CNEL readings as those closer to the roadway. All monitors recorded levels close to 65 dB CNEL because the winds during the night created substantial rustling noise within nearby eucalyptus trees at each site. Nocturnal noise levels are penalized an additional 10 dB in calculating CNEL. The true CNEL without wind noise is lower, especially in more rural environments away from traffic noise sources. Based upon water-recreation

and sports park compatibility noise standards of 70 dB CNEL, existing noise levels are well within acceptable levels.

Table 3.7-3: City of Oakley Noise Ordinance Standards

Noise Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly Leq, dB	55	45
<ol style="list-style-type: none"> Each of the noise levels specified above shall be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises (e.g. humming sounds, outdoor speaker systems). These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses. The City can impose noise level standards that are more restrictive than those specified above based upon determination of existing low ambient noise levels. Fixed noise sources which are typically of concern include, but are not limited to the following: <ul style="list-style-type: none"> HVAC Systems Cooling Towers/Evaporative Condensers Pump Stations Lift Stations Emergency Generators Boilers Steam Valves Steam Turbines Generators Fans Air Compressors Heavy Equipment Conveyor Systems Transformers Pile Drivers Grinders Drill Rigs Gas or Diesel Motors Welders Cutting Equipment Outdoor Speakers Blowers 		
<p>The types of uses which may typically produce the noise sources described above include but are not limited to: Industrial facilities including pump stations, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, and athletic fields.</p>		

TABLE 3.7-4. ON-SITE NOISE MONITORING SUMMARY

Parameter	Site 1	Site 2	Site 3	Site 4
24-Hour CNEL	65	64	65	66
Peak 1-HR LEQ	64	63	63	68
When (?)	9-10 p.m.	8-9 p.m.	10-11 a.m.	10-11 a.m.
2nd Highest LEQ	63	62	62	64
When (?)	8-10 p.m.	7-8 p.m.	9-10 p.m.	8-9 a.m.
Quietest Hour	51	52	56	53
When (?)	1-2 a.m.	1-2 a.m.	1-2 a.m.	1-3 a.m.
Maximum	84	84	84	91
Minimum	40	43	49	40

Source: Giroux & Associates

Site 1: N end of Sellers Road at ranch buildings

Site 2: Sellers Road, 150 feet N of Cypress Road

Site 3: Jersey Island Road, 0.5 mile N of Cypress Road

Site 4: N end of Knightsen, 100 feet N of Cypress Road

3.7.2 Impacts and Mitigation Measures

Three noise concerns are typically identified with land use changes such as that proposed for the project area. First, construction activities, especially heavy equipment use during building demolition and grading, would create short-term noise increases near the project site. Second, upon completion, project-related (park and public access) traffic would cause an incremental increase in area-wide noise levels throughout the project area. Since, however, the number of trips generated by the proposed project would generally be limited, the impact of ambient noise on the project site, rather than project traffic noise impacts to the community, is the third concern. Third, park and ballfield noise impacts to adjacent houses also are of concern.

Significance Criteria

CEQA Guidelines identify significant impacts as those that cause standards to be exceeded where they are currently met. An impact is also considered significant if it "substantially" worsens an existing unacceptable noise environment, or creates an exposure of persons to noise levels exceeding standards established in the local general plan or other applicable regulations.

"Substantially" is not defined in any guidelines. The accuracy of sound level meters and of sound propagation computer models is no better than ± 1.0 dB. This is also the human loudness difference discrimination level under ideal laboratory conditions. Most people cannot distinguish a change in the noise environment that differs by less than 3 dB between the pre- and post-project exposure if the change occurs under ambient conditions. The proposed project is forecast to generate 125 daily trips. If 100 of those trips used Cypress Road into Oakley, the traffic noise from the proposed project would be 42 dB CNEL at 100 feet from the roadway centerline. Existing traffic noise at this set-back is 59 dB CNEL, and is forecast to increase to 63.5 dB CNEL at build-out conditions. Project traffic will increase noise by no more than 0.1 – 0.2 dB. Project traffic impacts to the acoustic baseline are less than significant because it will not be a perceptible change.

Any potential operational impacts are therefore only related to compatibility of proposed uses with the ambient acoustic environment. No traffic noise represents any constraint to the proposed for future build-out conditions. On-road traffic represents the only possible noise constraint to site development, and traffic noise is confined to a very narrow corridor along project vicinity roadways.

The Oakley General Plan Noise Element catalogs the following distances to the 70 dB CNEL contour considered acceptable for park and water recreation uses:

Cypress Road @ Sellers Road	-	43 feet to centerline
Sellers Road N of Cypress	-	18 feet to centerline
Jersey Island Road N of Cypress	-	19 feet to centerline

The City of Oakley limits construction activities to hours of lesser noise sensitivity to minimize nuisance noise impacts. The weekday hours of 7:30 a.m. to 5:30 p.m. are allowed on grading permits. Standard conditions also require that all equipment must operate with factory-equipped mufflers, and that staging areas be located as far from residential uses as is practical. These conditions are considered as project features because they are required by City permit conditions.

Alternative 1: Minimal Fill

IMPACT 3.7.1-1: CONSTRUCTION NOISE IMPACTS (DUTCH SLOUGH RESTORATION PROJECT, RELATED PROJECTS, AND ALL OPTIONS)

Temporary construction noise impacts would vary markedly because the noise strength of construction equipment ranges widely as a function of the equipment used and its activity level. Short-term construction noise impacts tend to occur in discrete phases dominated initially by site clearing (including building demolition) and grading, then, for the park site, by foundation construction, and finish construction. Human hearing perceives a 3-dB increase as marginally perceptible and a 10-dB increase as twice as loud. Any impacts from project construction thus depend upon the setback distance between the source and receiver, and also on the number of pieces of equipment working within a fixed amount of space.

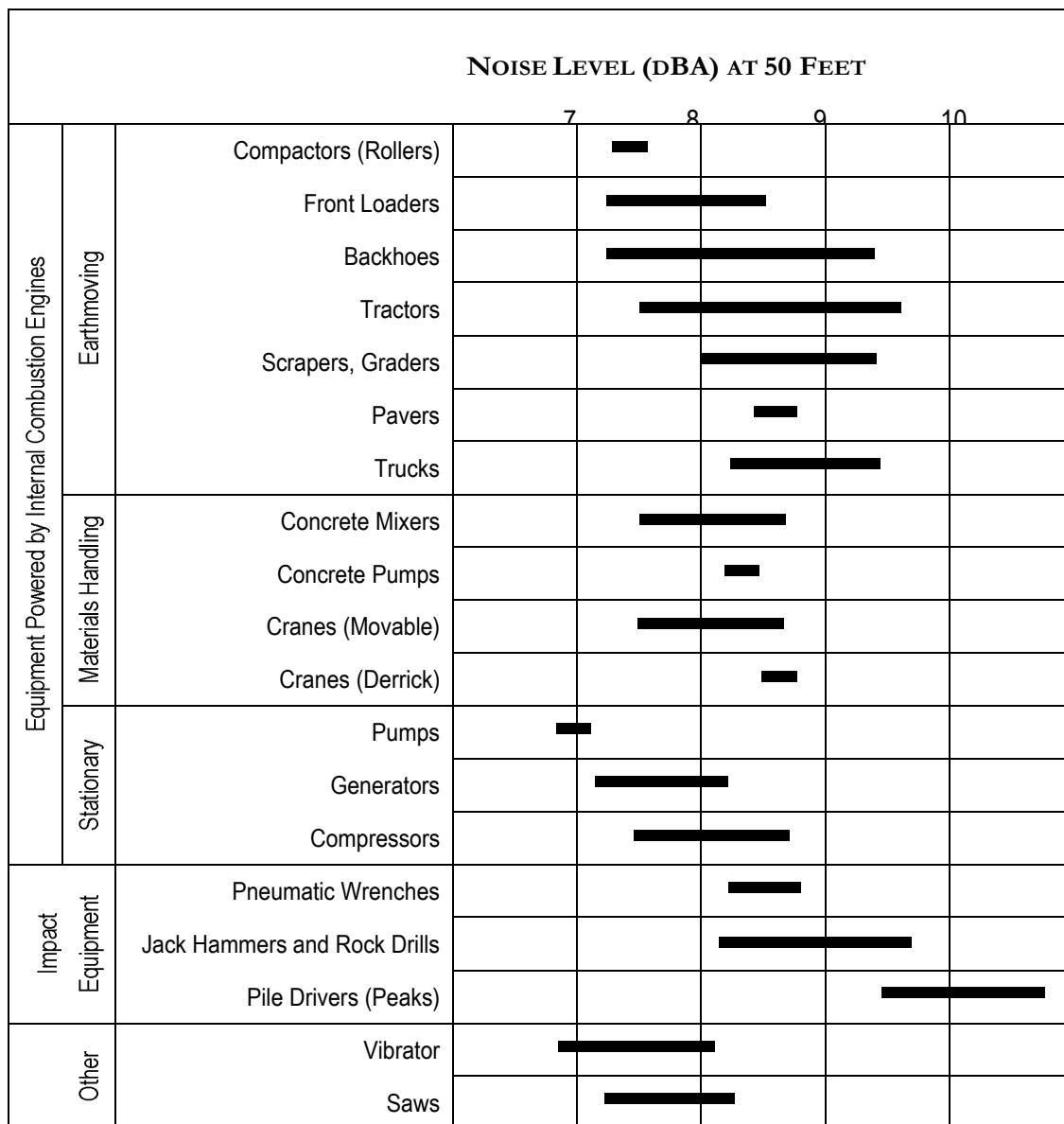
Measured noise levels at the closest receivers to various project activities have recorded maxima of around 80 dB. Construction activity noise levels exceeding 80 dB would be clearly perceptible. The earth-moving (grading) activities are seen in Figure 3.7.1 to be the noisiest sources during the site clearing, grading, and construction process, with equipment noise ranging from 75 to 90 dBA at 50 feet from the source. The range of noise levels shown in Figure 3.7.1 is meant to indicate that long-term (hourly or more) noise levels are at the lower end of the range (around 80 dB), while short-term peaks are at the upper end (around 90 dB).

Spherically radiating point sources of noise emissions are atmospherically attenuated by a factor of 6 dB per doubling of distance, or about 20 dB in 500 feet of propagation. The quieter single pieces of construction noise sources would drop below 80 dB by about 50 feet from the source, while the loudest sources might still be detectable above the local background out to 160 feet from the construction area.

The minimum fill alternative would entail use of isolated pieces of heavy equipment. The noise impact envelope from a single piece of equipment extends to 50 feet on average, and perhaps 160 feet for single event maxima. Most activities would maintain a much greater separation distance from off-site noise-sensitive land uses. Construction noise impacts from construction activities associated with the minimum fill alternative are considered less-than-significant.

If multiple noise sources operate in close proximity, their noise characteristics are logarithmically additive. The same amount of equipment confined into a limited space obviously has a larger noise effect than single pieces of equipment. The cumulative effect of multiple-equipment operations is as follows:

- 2 pieces of equipment - 3 dB louder than a single piece
- 3 pieces of equipment - 5 dB louder than a single piece
- 10 pieces of equipment - 10 dB louder than a single piece

Figure 3.7.1: Typical Construction Equipment Noise Generation Levels

Source: EPA PB 206717, Environmental Protection Agency, December 31, 1971, "Noise from Construction Equipment and Operations."

MITIGATION 3.7.1-1: NOISE FROM HAULING OF SOILS

Hauling of fill from off-site borrow sites or off-hauling of any contaminated site soils shall minimize passing any substantial collection of noise-sensitive land uses (i.e. occupied houses, schools, hospitals), and shall be limited to less than 250 loads per day.

IMPACT SIGNIFICANCE AFTER MITIGATION

Less than significant with mitigation.

IMPACT 3.7.1-2: PARK/BALLFIELD/SPECIAL EVENT NOISE IMPACTS (CITY COMMUNITY PARK PROJECT ONLY)

There are many handbooks that specify noise levels for heavy equipment, or cars, or mechanical equipment, but there are no published data on ballfield or other active recreation noise levels. Certainly the intensity of the action, the number of spectators and the sport itself will dictate how much intrusive sound is generated. It should be noted that ballfields are not proposed as part of the initial park development plans that are assessed at a project-level in this document, but rather as part of ultimate park buildout. To provide some basis for analysis, noise measurements were previously conducted at a cloverleaf softball complex (2 softball fields and two Little League fields with concession stands, restrooms and night lighting). These are summarized in Table 3.7-5. Noise measurements were made in the evening from 6:00 p.m. to 11:00 p.m. with the last activity over at 10:00 p.m., with some "stragglers" remaining for a few minutes after 10:00 p.m. Measurements were made at 500 feet from the snack bar/ restroom in the middle of the complex. This distance would perhaps approximate the distance to the closest future home to the proposed sports complex. The measurements during Little League games and practice, and during adult league softball, were as follows (hourly average [Leq] and short-term maxima, in dBA):

Table 3.7-5. Representative Noise Levels From Ballfield Activities		
Time (p.m.)	Avg. Level (dBA)	1-Sec. Max. (Lmax)
6 - 7	54	70
7 - 8	55	72*
8 - 9	52	64
9 -10	53	68
10 -11	49	66

*Brief use of public address system.

Source: Chaparrosa Park Nocturnal Noise Study; City of Laguna Niguel, 1994.

The measured baseline noise levels in the evening hours around the proposed sports park are in the higher 50 dB range. The City's noise standard before 10 p.m. is 55 dB Leq. Baseball/softball noise levels are less than this baseline level, and are within City noise standards at 500 feet from the center of the sports complex. Therefore, proposed park use for baseball/softball would not substantially increase off-site noise exposures to a level that would be considered significant.

IMPACT SIGNIFICANCE

Less than significant

Alternative 2: Moderate Fill Alternative**IMPACT 3.7.2-1: CONSTRUCTION NOISE IMPACTS (DUTCH SLOUGH RESTORATION PROJECT, RELATER PROJECTS, AND AL OPTIONS)**

Construction activities for this alternative would require operation of large numbers of scrapers and other noisy equipment. If ten pieces of equipment operate in close proximity, the 50-foot reference noise level would be increased from 85 dB for a single piece to 95 dB for a 10-piece fleet. The resulting noise impact envelope would extend to 160 feet from the work area for average conditions, and perhaps to 500 feet for short-term peaks. The maximum noise would occur in the primary cut and fill areas, which are typically well beyond even 500 feet from any concentration of residential uses. Although occasional noise perceptibility would be an adverse effect, the infrequency of such noise events, and the restriction to hour of lesser sensitivity would render this impact as less-than-significant.

MITIGATION 3.7.2-1: NOISE FROM HAULING OF SOILS

Same as Mitigation 3.7.1-1

IMPACT SIGNIFICANCE AFTER MITIGATION

Less than significant with mitigation.

IMPACT 3.7.2-2: PARK/BALLFIELD/SPECIAL EVENT NOISE IMPACTS (CITY COMMUNITY PARK PROJECT ONLY)

Same as for Alternative 1.

Alternative 3: Maximum Fill Alternative

The maximum fill alternative would generate on-site construction activity impacts similar to Alternative 2, which are considered adverse, but less-than-significant. However, this alternative requires the use of off-site trucks to import fill. A typical daily haul scenario might include 250 truck trips possible passing various noise-sensitive uses (residences, Ironhouse School, etc.). The noise level associated with 250 truck trips in/out is 60 dB CNEL at 100 feet from the centerline of any haul route. The existing baseline level along Cypress of 60 dB CNEL, and less along Sellers Road south of the site. Any access alternative involving fill trucking at levels of 250 loads per day will raise noise levels along any haul route by +3 dB or more. Such impacts are considered temporarily significant.

MITIGATION 3.7.3-1: NOISE FROM HAULING OF SOILS

Same as Mitigation 3.7.1-1

Impact 3.7.3-2: Park/Ballfield/Special Event Noise Impacts (City Community Park Project Only)

Same as for Alternative 1.

Alternative 4: No Project Alternative

No construction, traffic, or ballfield noise impacts would be associated with this alternative.